165-- oↄ 702- 1600

RAW SEQUENCE LISTING   DATE: 01/03/2002
PATENT APPLICATION: US/09/722,602A   TIME: 13:02:00

Input Set : **A:\seqlist.txt**
Output Set: **N:\CRF3\01032002\I722602A.raw**

ENTERED

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 4 <110> APPLICANT: ARNOLD, Frances H.
 5        PETROUNIA, Ionna P.
 6        SUN, Lianhong
 8 <120> TITLE OF INVENTION: DIRECTED EVOLUTION OF OXIDASE ENZYMES
11 <130> FILE REFERENCE: 9373/1G811US1
13 <140> CURRENT APPLICATION NUMBER: 09/722,602A
14 <141> CURRENT FILING DATE: 2000-11-27
16 <150> PRIOR APPLICATION NUMBER: US 09/571,553
17 <151> PRIOR FILING DATE: 2000-05-16
19 <160> NUMBER OF SEQ ID NOS: 48
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25 <212> TYPE: DNA
26 <213> ORGANISM: Artificial Sequence
28 <220> FEATURE:
29 <223> OTHER INFORMATION: Primer
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36 <212> TYPE: DNA
37 <213> ORGANISM: Artificial Sequence
39 <220> FEATURE:
40 <223> OTHER INFORMATION: Primer
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43  cttccttcta gattactgag taacgcgaat cgt                          33
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47 <212> TYPE: DNA
48 <213> ORGANISM: Artificial Sequence
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51 <223> OTHER INFORMATION: Primer
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58 <212> TYPE: DNA
59 <213> ORGANISM: Artificial Sequence
61 <220> FEATURE:
62 <223> OTHER INFORMATION: Primer
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70 <213> ORGANISM: Artificial Sequence
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 72 <220> FEATURE:
 73 <223> OTHER INFORMATION: Primer
 75 <400> SEQUENCE: 5
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 79 <211> LENGTH: 30
 80 <212> TYPE: DNA
 81 <213> ORGANISM: Artificial Sequence
 83 <220> FEATURE:
 84 <223> OTHER INFORMATION: Primer
 86 <400> SEQUENCE: 6
 87  cttcctaagc tttcactgag taacgcgaat                              30
 89 <210> SEQ ID NO: 7
 90 <211> LENGTH: 30
 91 <212> TYPE: DNA
 92 <213> ORGANISM: Artificial Sequence
 94 <220> FEATURE:
 95 <223> OTHER INFORMATION: Primer
 97 <400> SEQUENCE: 7
 98  ggaagaggta ccaatacgca aaccgcctct                              30
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101 <211> LENGTH: 29
102 <212> TYPE: DNA
103 <213> ORGANISM: Artificial Sequence
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106 <223> OTHER INFORMATION: Primer
108 <400> SEQUENCE: 8
109  ttgttcctgc ggctgcagca attgaaccg                               29
111 <210> SEQ ID NO: 9
112 <211> LENGTH: 30
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114 <213> ORGANISM: Artificial Sequence
116 <220> FEATURE:
117 <223> OTHER INFORMATION: Primer
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123 <211> LENGTH: 639
124 <212> TYPE: PRT
125 <213> ORGANISM: Artificial Sequence
127 <220> FEATURE:
128 <223> OTHER INFORMATION: Mutant 9.16.8D2 (N537D) of D. dendroides GaO
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132   1               5                   10                  15
133  Thr Cys Asp Ser Ala Gln Ser Gly Asn Glu Cys Asn Lys Ala Ile Asp
134              20                  25                  30
135  Gly Asn Lys Asp Thr Phe Trp His Thr Phe Tyr Gly Ala Asn Gly Asp
136              35                  40                  45
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Input Set : **A:\seqlist.txt**
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137  Pro Lys Pro Pro His Thr Tyr Thr Ile Asp Met Lys Thr Thr Gln Asn
138      50                  55                  60
139  Val Asn Gly Leu Ser Met Leu Pro Arg Gln Asp Gly Asn Gln Asn Gly
140  65                  70                  75                  80
141  Trp Ile Gly Arg His Glu Val Tyr Leu Ser Ser Asp Gly Thr Asn Trp
142                  85                  90                  95
143  Gly Ser Pro Val Ala Ser Gly Ser Trp Phe Ala Asp Ser Thr Thr Lys
144              100                 105                 110
145  Tyr Ser Asn Phe Glu Thr Arg Pro Ala Arg Tyr Val Arg Leu Val Ala
146          115                 120                 125
147  Ile Thr Glu Ala Asn Gly Gln Pro Trp Thr Ser Ile Ala Glu Ile Asn
148      130                 135                 140
149  Val Phe Gln Ala Ser Ser Tyr Thr Ala Pro Gln Pro Gly Leu Gly Arg
150  145                 150                 155                 160
151  Trp Gly Pro Thr Ile Asp Leu Pro Ile Val Pro Ala Ala Ala Ala Ile
152                  165                 170                 175
153  Glu Pro Thr Ser Gly Arg Val Leu Met Trp Ser Ser Tyr Arg Asn Asp
154              180                 185                 190
155  Ala Phe Gly Gly Ser Pro Gly Gly Ile Thr Leu Thr Ser Ser Trp Asp
156          195                 200                 205
157  Pro Ser Thr Gly Ile Val Ser Asp Arg Thr Val Thr Val Thr Lys His
158      210                 215                 220
159  Asp Met Phe Cys Pro Gly Ile Ser Met Asp Gly Asn Gly Gln Ile Val
160  225                 230                 235                 240
161  Val Thr Gly Gly Asn Asp Ala Lys Lys Thr Ser Leu Tyr Asp Ser Ser
162                  245                 250                 255
163  Ser Asp Ser Trp Ile Pro Gly Pro Asp Met Gln Val Ala Arg Gly Tyr
164              260                 265                 270
165  Gln Ser Ser Ala Thr Met Ser Asp Gly Arg Val Phe Thr Ile Gly Gly
166          275                 280                 285
167  Ser Trp Ser Gly Gly Val Phe Glu Lys Asn Gly Glu Val Tyr Ser Pro
168      290                 295                 300
169  Ser Ser Lys Thr Trp Thr Ser Leu Pro Asn Ala Lys Val Asn Pro Met
170  305                 310                 315                 320
171  Leu Thr Ala Asp Lys Gln Gly Leu Tyr Arg Ser Asp Asn His Ala Trp
172              325                 330                 335
173  Leu Phe Gly Trp Lys Lys Gly Ser Val Phe Gln Ala Gly Pro Ser Thr
174              340                 345                 350
175  Ala Met Asn Trp Tyr Tyr Thr Ser Gly Ser Gly Asp Val Lys Ser Ala
176          355                 360                 365
177  Gly Lys Arg Gln Ser Asn Arg Gly Val Ala Pro Asp Ala Met Cys Gly
178      370                 375                 380
179  Asn Ala Val Met Tyr Asp Ala Val Lys Gly Lys Ile Leu Thr Phe Gly
180  385                 390                 395                 400
181  Gly Ser Pro Asp Tyr Gln Asp Ser Asp Ala Thr Thr Asn Ala His Ile
182              405                 410                 415
183  Ile Thr Leu Gly Glu Pro Gly Thr Ser Pro Asn Thr Val Phe Ala Ser
184              420                 425                 430
185  Asn Gly Leu Tyr Phe Ala Arg Thr Phe His Thr Ser Val Val Leu Pro
```

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Output Set: N:\CRF3\01032002\I722602A.raw

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186           435                    440                    445
187   Asp Gly Ser Thr Phe Ile Thr Gly Gly Gln Arg Arg Gly Ile Pro Phe
188       450                    455                    460
189   Glu Asp Ser Thr Pro Val Phe Thr Pro Glu Ile Tyr Val Pro Glu Gln
190   465                    470                    475                    480
191   Asp Thr Phe Tyr Lys Gln Asn Pro Asn Ser Ile Val Arg Val Tyr His
192                       485                    490                    495
193   Ser Ile Ser Leu Leu Leu Pro Asp Gly Arg Val Phe Asn Gly Gly Gly
194                   500                    505                    510
195   Gly Leu Cys Gly Asp Cys Thr Thr Asn His Phe Asp Ala Gln Ile Phe
196               515                    520                    525
197   Thr Pro Asn Tyr Leu Tyr Asn Ser Asp Gly Asn Leu Ala Thr Arg Pro
198       530                    535                    540
199   Lys Ile Thr Arg Thr Ser Thr Gln Ser Val Lys Val Gly Gly Arg Ile
200   545                    550                    555                    560
201   Thr Ile Ser Thr Asp Ser Ser Ile Ser Lys Ala Ser Leu Ile Arg Tyr
202                   565                    570                    575
203   Gly Thr Ala Thr His Thr Val Asn Thr Asp Gln Arg Arg Ile Pro Leu
204               580                    585                    590
205   Thr Leu Thr Asn Asn Gly Gly Asn Ser Tyr Ser Phe Gln Val Pro Ser
206           595                    600                    605
207   Asp Ser Gly Val Ala Leu Pro Gly Tyr Trp Met Leu Phe Val Met Asn
208       610                    615                    620
209   Ser Ala Gly Val Pro Ser Val Ala Ser Thr Ile Arg Val Thr Gln
210   625                    630                    635
212   <210> SEQ ID NO: 11
213   <211> LENGTH: 639
214   <212> TYPE: PRT
215   <213> ORGANISM: Artificial Sequence
217   <220> FEATURE:
218   <223> OTHER INFORMATION: Mutant 9.16.6C11 (V494A, C515S) of D. dendroides
219         GaO
221   <400> SEQUENCE: 11
222   Ala Ser Ala Pro Ile Gly Ser Ala Ile Ser Arg Asn Asn Trp Ala Val
223    1                5                   10                   15
224   Thr Cys Asp Ser Ala Gln Ser Gly Asn Glu Cys Asn Lys Ala Ile Asp
225               20                   25                   30
226   Gly Asn Lys Asp Thr Phe Trp His Thr Phe Tyr Gly Ala Asn Gly Asp
227           35                   40                   45
228   Pro Lys Pro Pro His Thr Tyr Thr Ile Asp Met Lys Thr Thr Gln Asn
229       50                   55                   60
230   Val Asn Gly Leu Ser Met Leu Pro Arg Gln Asp Gly Asn Gln Asn Gly
231   65                   70                   75                   80
232   Trp Ile Gly Arg His Glu Val Tyr Leu Ser Ser Asp Gly Thr Asn Trp
233               85                   90                   95
234   Gly Ser Pro Val Ala Ser Gly Ser Trp Phe Ala Asp Ser Thr Thr Lys
235               100                   105                   110
236   Tyr Ser Asn Phe Glu Thr Arg Pro Ala Arg Tyr Val Arg Leu Val Ala
237           115                   120                   125
```

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PATENT APPLICATION: US/09/722,602A   TIME: 13:02:00

Input Set : A:\seqlist.txt
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```
238  Ile Thr Glu Ala Asn Gly Gln Pro Trp Thr Ser Ile Ala Glu Ile Asn
239      130                 135                 140
240  Val Phe Gln Ala Ser Ser Tyr Thr Ala Pro Gln Pro Gly Leu Gly Arg
241  145                 150                 155                 160
242  Trp Gly Pro Thr Ile Asp Leu Pro Ile Val Pro Ala Ala Ala Ala Ile
243                  165                 170                 175
244  Glu Pro Thr Ser Gly Arg Val Leu Met Trp Ser Ser Tyr Arg Asn Asp
245              180                 185                 190
246  Ala Phe Gly Gly Ser Pro Gly Gly Ile Thr Leu Thr Ser Ser Trp Asp
247          195                 200                 205
248  Pro Ser Thr Gly Ile Val Ser Asp Arg Thr Val Thr Val Thr Lys His
249          210                 215                 220
250  Asp Met Phe Cys Pro Gly Ile Ser Met Asp Gly Asn Gly Gln Ile Val
251  225                 230                 235                 240
252  Val Thr Gly Gly Asn Asp Ala Lys Lys Thr Ser Leu Tyr Asp Ser Ser
253                  245                 250                 255
254  Ser Asp Ser Trp Ile Pro Gly Pro Asp Met Gln Val Ala Arg Gly Tyr
255              260                 265                 270
256  Gln Ser Ser Ala Thr Met Ser Asp Gly Arg Val Phe Thr Ile Gly Gly
257          275                 280                 285
258  Ser Trp Ser Gly Gly Val Phe Glu Lys Asn Gly Glu Val Tyr Ser Pro
259          290                 295                 300
260  Ser Ser Lys Thr Trp Thr Ser Leu Pro Asn Ala Lys Val Asn Pro Met
261  305                 310                 315                 320
262  Leu Thr Ala Asp Lys Gln Gly Leu Tyr Arg Ser Asp Asn His Ala Trp
263                  325                 330                 335
264  Leu Phe Gly Trp Lys Lys Gly Ser Val Phe Gln Ala Gly Pro Ser Thr
265              340                 345                 350
266  Ala Met Asn Trp Tyr Tyr Thr Ser Gly Ser Gly Asp Val Lys Ser Ala
267          355                 360                 365
268  Gly Lys Arg Gln Ser Asn Arg Gly Val Ala Pro Asp Ala Met Cys Gly
269      370                 375                 380
270  Asn Ala Val Met Tyr Asp Ala Val Lys Gly Lys Ile Leu Thr Phe Gly
271  385                 390                 395                 400
272  Gly Ser Pro Asp Tyr Gln Asp Ser Asp Ala Thr Thr Asn Ala His Ile
273                  405                 410                 415
274  Ile Thr Leu Gly Glu Pro Gly Thr Ser Pro Asn Thr Val Phe Ala Ser
275              420                 425                 430
276  Asn Gly Leu Tyr Phe Ala Arg Thr Phe His Thr Ser Val Val Leu Pro
277          435                 440                 445
278  Asp Gly Ser Thr Phe Ile Thr Gly Gly Gln Arg Arg Gly Ile Pro Phe
279      450                 455                 460
280  Glu Asp Ser Thr Pro Val Phe Thr Pro Glu Ile Tyr Val Pro Glu Gln
281  465                 470                 475                 480
282  Asp Thr Phe Tyr Lys Gln Asn Pro Asn Ser Ile Val Arg Ala Tyr His
283                  485                 490                 495
284  Ser Ile Ser Leu Leu Leu Pro Asp Gly Arg Val Phe Asn Gly Gly Gly
285          500                 505                 510
286  Gly Leu Ser Gly Asp Cys Thr Thr Asn His Phe Asp Ala Gln Ile Phe
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VERIFICATION SUMMARY　　　　　　　　DATE: 01/03/2002
PATENT APPLICATION:　US/09/722,602A　　　TIME: 13:02:01

Input Set : **A:\seqlist.txt**
Output Set: **N:\CRF3\01032002\I722602A.raw**

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